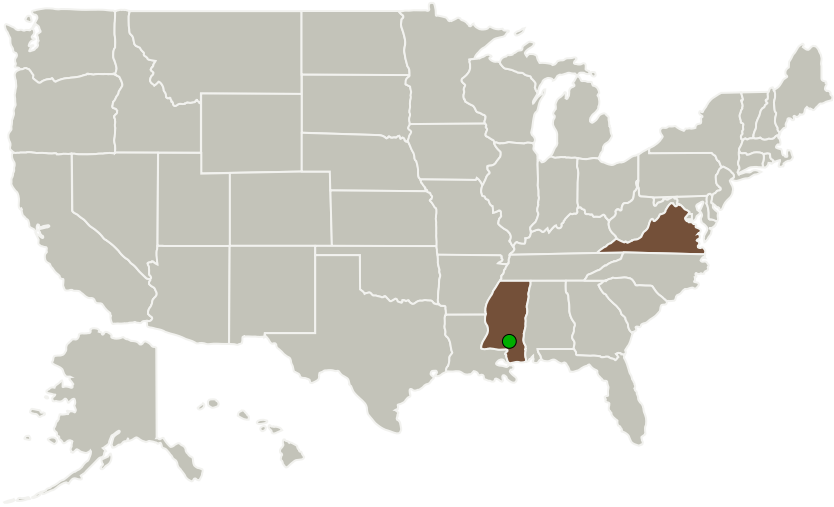
Passively Powered and Programmable Sensor-RFID for ISHM Systems, Phase II

Completed Technology Project (2010 - 2012)

Project Introduction

To date there are several approaches for incorporating sensing capabilities into RFID. Active tags use batteries to power their communication circuitry, sensors, and microcontroller. Active tags benefit from relatively long wireless range and can achieve high data and sensor activity rates. However, the batteries required by active tags are disadvantageous for device cost, lifetime, weight, and volume. In contrast, passive sensor tags receive all of their operating power from external RF transmitting sources and are not limited by battery life. One attractive feature of passive sensor tags is the prospect of permanently embedding them in objects for structural monitoring. Another is their suitability for applications in which neither batteries nor wired connections are feasible, for weight, volume, cost, or other reasons. A limitation of purely passive sensor tags is the requirement of proximity to a RF transmitter. Since lower power consumption is one major trend in RF circuit design, a self-powered system by means of energy harvesting becomes very attractive. It can serve as the enabling technology for novel applications such as ambient intelligence. Using a power harvesting technique for wireless rechargeable battery smart sensor and enhanced RFID are the key elements for successfully distributing sensors across sensor networks.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Mobitrum Corporation	Lead Organization	Industry	McLean, Virginia
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations	
Mississippi	Virginia

Project Transitions

January 2010: Project Start

January 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139321)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Mobitrum Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

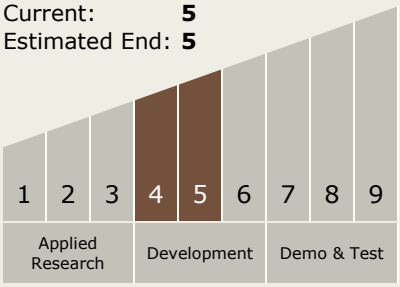
Carlos Torrez

Principal Investigator:

Ray Wang

Technology Maturity (TRL)

Start: **4**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.4 Flight and Ground Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System